HAHN AND ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

December 19, 2003

SENT VIA E-MAIL

Mr. Forest J. Lane
Environmental Manager
Lakeside Industries
P.O. Box 7016
Issaquah, WA 98027

HAI File No. 6235

SUBJECT: Proposal and Cost Estimate to Install Two Monitoring Wells in the Vicinity of UIC#1
Lakeside Industries – Portland, Oregon Facility
4850 N.W. Front Avenue, Portland, Oregon

Dear Mr. Lane:

1.0 Introduction

At your request, Hahn and Associates, Inc. (HAI) has prepared a proposal and cost estimate for monitoring well installation activities at the above-referenced property. The proposed Phase II ESA activities are designed to clarify whether polynuclear aromatic hydrocarbons (PAHs) and other contaminants exist in groundwater at levels of concern in the vicinity of an abandoned drywell.

2.0 Background

In September 2003, HAI conducted underground injection control (UIC) decommissioning activities for two drywells at the subject property. Decommissioning activities and analytical results are documented in the UIC Release Report[1]. As stated in the report, the analytical testing identified a release of diesel- and oil-type petroleum hydrocarbons in soils in the vicinity of UIC#1. Subsequent testing of groundwater from a push probe boring in the vicinity of UIC#1 indicated diesel- and oil-type petroleum hydrocarbons and PAHs are present in groundwater.

Because of the nature of the contaminants (PAHs) at this site, an investigative method is needed for groundwater that will allow the collection of unfiltered samples with a suspended solid content that is representative of the aquifer. Unfortunately, less expensive screening-level groundwater sampling techniques, such as collection from push probe borings, tend to have elevated suspended solids and may overestimate the actual contaminant concentration that is mobile in the groundwater. Therefore, it is proposed that groundwater at this site be sampled from drilled monitoring wells by low-flow sampling techniques.

The scope of work in this proposal is designed to address the presence of PAHs in groundwater in the vicinity of UIC#1 by installing and sampling two groundwater monitoring wells adjacent to UIC#1. It should be noted that two wells are not sufficient to

[1] Hahn and Associates, Inc. (2003). *UIC Release Report, Lakeside Industries, 4850 NW Front Street, Portland, Oregon* (HAI Project No. 6235). November 12, 2003.

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establish groundwater flow direction. Existing Gunderson, Inc. groundwater monitoring data will be used to estimate groundwater flow direction at this area of the site.

3.0 Proposed Scope of Work

The proposed monitoring well installation activities will involve the following major tasks: 1) supplemental research activities; 2) monitoring well installation and development activities; 3) water level monitoring and low-flow groundwater monitoring event; 4) laboratory analysis of groundwater samples; and 5) report preparation.

3.1 Task 1 –Supplemental Research Activities

Supplemental research has been conducted to gain a better understanding of the subsurface conditions of the subject property and allow for an appropriate evaluation of groundwater depth, flow direction, and seasonal groundwater level fluctuations at the site. An understanding of these parameters will allow for appropriate scoping of the installation of the two groundwater monitoring wells proposed herein. The research includes requesting and reviewing data resources (i.e., Gunderson, Inc. groundwater reports).

3.2 Task 2 – Monitoring Well Installation and Development Activities

Two monitoring wells are proposed to be installed at the property (Figure 1). Both monitoring wells will be installed with a hollow stem auger drilling rig. Groundwater monitoring well #1 (MW-1) will be located at the former UIC discharge location. MW-1 will be completed to an estimated depth of 12 feet below ground surface (bgs) to evaluate seasonally perched water within the gravel drain field at UIC#1. Monitoring well MW-2 will be located in a down-gradient location (northwest as inferred from Gunderson, Inc. groundwater monitoring data) just outside the gravel drainfield. MW-2 will be completed to an estimated depth of 35 feet bgs to evaluate uppermost perennial groundwater in the native alluvial deposits.

The monitoring wells will be constructed with 2-inch inside diameter (ID), threaded, schedule 40, polyvinyl chloride (PVC) blank casing and 0.010-inch slotted screen installed within an appropriate sand pack and well seal. The slotted screen will be set from 7 to 12 feet bgs in MW-1, and from 25 to 35 feet bgs in MW-2. The sand pack will be placed in the annular space from the bottom of the borehole to 3 feet above the top of the screen with a Colorado 10/20 silica sand. The wells will then be developed with a surge block to set the sand pack. A well seal composed of 3/4-inch bentonite chips will be placed on top of the sand pack to a depth of about 2 feet bgs and hydrated.

Each well will be completed with an above-ground monument surrounded by three guard posts. The well casings will be fitted with locking caps.

Final placement of the borings and monitoring wells will be made in the field based on the locations of underground and overhead utilities as well as other site features (i.e., location of gravel drain field).

At least 24 hours following installation of the monitoring wells, the wells will be further developed by purging with a submersible or peristaltic pump in an attempt to remove the fine sediment from around the well bore. During development, at least 10 well volumes of water, and the volume of any well construction water, will be removed from each well. The parameters pH, temperature, and conductivity will be measured during the development process. Following purging, the wells will be considered developed when the parameters have stabilized. Stabilization is considered to have been met when the last three measured values for each of the above parameters are within 10 percent of each other.

Collection of continuous 5-foot long soil cores will be attempted with a split-barrel sampling device to characterize the subsurface materials. The soil cores will be screened in the field for visual, olfactory, and sheen evidence of environmental contamination. Field screening will also include headspace method using a portable photoionization detector (PID) to assess for volatile organic compounds.

All monitoring well installation work will be performed by an Oregon-bonded and licensed monitoring well constructor. The monitoring well installations will be completed in accordance with the Oregon Groundwater Law (Oregon Revised Statute (ORS) Chapter 537) and the Rules for Construction and Maintenance of Monitoring Wells and Other Holes in Oregon (Oregon Administrative Rules (OAR) Chapter 690, Division 240).

3.3 Task 3 – Water Level and Low-Flow Groundwater Monitoring Event

At least 72 hours following installation and development of the monitoring wells, a representative groundwater sample will be obtained from each well using low-flow techniques. Water will be purged from each well at a low flow rate (less than one liter per minute) using a stainless steel bladder pump equipped with new polyethylene tubing.

During purging, the water is pumped through a flow cell that allows for continuous monitoring of a number of water chemistry parameters. Once stabilization of the parameters is achieved, the groundwater sample is collected into the appropriate sampling containers.

Prior to any monitoring well sampling event, the static water levels in monitoring wells will be measured to the nearest 1/100th of a foot with a Solinst water level indicator (conductive probe). The water levels will be measured from the north side of the top of the casing where a notch will be cut. The water level from a known staff gauge in the Willamette River will also be recorded during each water level monitoring event.

Since at least three wells are needed within each water-bearing zone to determine groundwater flow direction, an elevation survey of the monitoring wells is not proposed at this time.

3.4 Task 4 – Laboratory Analyses

The two unfiltered groundwater samples will be analyzed for diesel- and oil-range total petroleum hydrocarbons (TPH) by Northwest Method TPH-Dx, PAHs by EPA Method

8270 SIM and VOCs by EPA Method 8260. The groundwater samples will be analyzed on a normal (10-business day) basis.

3.5 Task 5 – Report Preparation

Upon completion of the work activities and receipt of the analytical data, a report will be prepared that will contain a description of the work activities and the analytical results. Concentrations of contaminants detected in the samples, if any, will be reported in tabular form. The attachments will include a boring log summary table, laboratory analytical reports, and chain-of-custody documentation. The significance of findings of contamination, if any, will be elaborated in the report. The report will also incorporate earlier testing and investigation results relating to the UIC#1, and contain a discussion justifying no further action if that is deemed appropriate.

4.0 Estimated Costs

HAI proposes to conduct this project on a time and materials basis in accordance with the August 20, 2000 *Master Services Agreement* between Lakeside Industries and HAI, as amended. The estimated project costs are summarized as follows:

Task	Activity	Estimated Cost
Task 1	Supplemental Research and Scoping Activities	$1,050
Task 2	Monitoring Well Installation and Development	$4,800
	HAI Labor and Equipment	$1,800
	Drilling Contractor	$3,000
Task 3	Water Level Monitoring and Low-Flow Groundwater Monitoring Event	$1,100
Task 4	Laboratory Analyses	$950
Task 5	Report Preparation	$2,400
	Total Cost Estimate	$10,300

5.0 Schedule

Upon notice to proceed, field activities will be initiated within one to two weeks, depending on driller availability; analytical testing results will be available two weeks later; and a written report available approximately two weeks following.

6.0 Conditions and Limitations

All work undertaken in connection with this project will be invoiced on a time and materials basis in accordance with the then current HAI Schedule of Fees (attached to Master Services Agreement).

The information presented in the investigative report will represent only the conditions where drilling and sampling occurred. Extrapolations of those findings over the project

site are intended to help illustrate the presence (or lack of) and the magnitude of contamination. Conversely, the lack of detectable compounds does not translate to an overall uncontaminated site, but uncontaminated conditions only at the sampling point and time.

If there are any comments or questions regarding this proposal and cost estimate, please contact the undersigned. Thank you for the opportunity to be of service.

Sincerely,

Jill S. Betts
Senior Environmental Scientist

jbetts@hahnasoc.com

Attachments: Figure 1

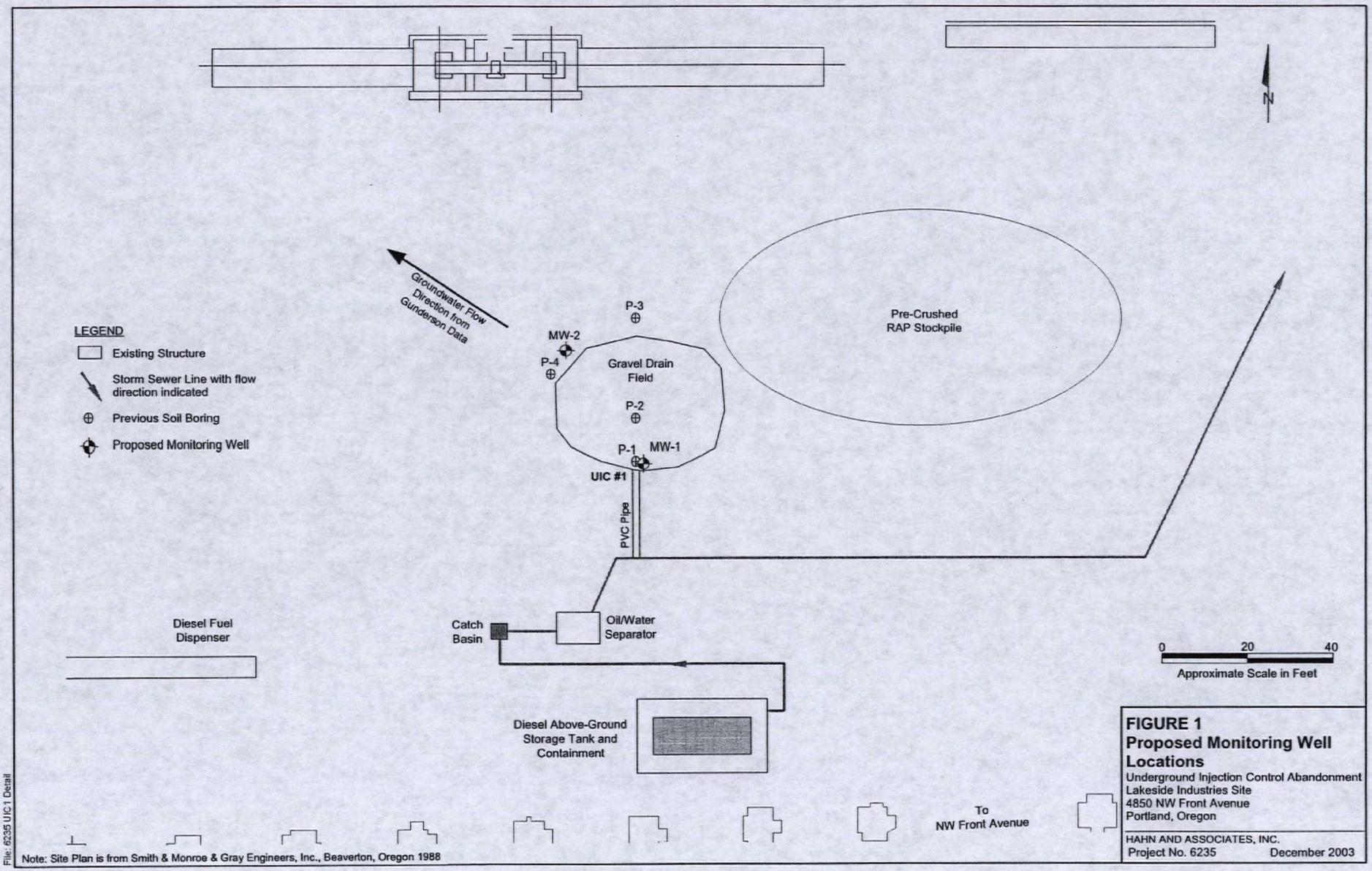

FIGURE 1
Proposed Monitoring Well Locations
Underground Injection Control Abandonment
Lakeside Industries Site
4850 NW Front Avenue
Portland, Oregon

HAHN AND ASSOCIATES, INC.
Project No. 6235 December 2003

Note: Site Plan is from Smith & Monroe & Gray Engineers, Inc., Beaverton, Oregon 1988

File: 6235 UIC1 Detail